

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) An internal combustion engine, comprising:
5 a head body defining at least a portion of a main combustion chamber, the main combustion chamber adapted to receive a dilute combustion mixture;
a compression member in the main combustion chamber ~~adapted to substantially seal with the body and~~ movable to compress the dilute combustion mixture;
a- an auxiliary combustion cavity in the cylinder head body disposed adjacent to and
10 having an open end in fluid communication with the main combustion chamber, the auxiliary combustion cavity being adapted to receive a portion of the dilute combustion mixture ~~in the combustion chamber~~ through the open end such that substantially all of the dilute combustion mixture received in the auxiliary combustion cavity is provided from a portion of the combustion mixture received in the main ~~from the~~ combustion chamber, ~~further adapted to create a~~
15 ~~substantially quiescent area therein;~~
an ignition source residing in the auxiliary combustion cavity substantially at an end of the cavity opposing the open end; and
an apertured member adjacent to the ignition source and having one or more apertures therein, the apertures operable to allow passage of the combustion mixture from the combustion
20 mixture supplied to the main combustion chamber to the ignition source and, upon ignition of the combustion mixture in the auxiliary combustion cavity, jet a portion of the ignited combustion mixture from the auxiliary combustion cavity into the main combustion chamber.
2. (Canceled)
- 25 3. (Currently Amended) The internal combustion engine of claim 1 wherein the compression member is a piston reciprocating in the main combustion chamber.

4. (Currently Amended) The internal combustion engine of claim 1 wherein the ~~body~~ head is a cylinder head.

5 5. (Currently Amended) The internal combustion engine of claim 1 further comprising a carrier housing removably received in the head ~~body~~; and
wherein the ignition source is carried by the carrier housing.

6. (Original) The internal combustion engine of claim 5 wherein the apertured member
10 resides on the carrier housing.

7. (Currently Amended) The internal combustion engine of claim 6 wherein the apertured member is a shield housing encasing the electrode ~~at least a portion~~ of the ignition source.

15 8. (Original) The internal combustion engine of claim 1 wherein the apertured member is a housing encasing at least a portion of the ignition source.

9. (Original) The internal combustion engine of claim 1 wherein the apertured member is between the open end and the ignition source.

20 10. (Original) The internal combustion engine of claim 1 wherein the ignition source is at the end of the cavity opposing the open end.

11. (Original) The internal combustion engine of claim 1 wherein the ignition source is a
25 center and ground electrodes of a spark plug.

12. (Original) The internal combustion engine of claim 11 wherein the apertured member resides on the spark plug.

13. (Currently Amended) The internal combustion engine of claim 1 wherein the head body is adapted to receive in at least one auxiliary combustion cavity either at least a first carrier housing adapted to position the ignition source at a first position in relation to the main combustion chamber, or and a second carrier housing, the first carrier housing adapted to position the ignition source at a second position in relation to the main combustion chamber at a different position than the second carrier housing, but not both carriers being received at the same time in the same auxiliary combustion cavity.

14. (Currently Amended) The internal combustion engine of claim 13 + wherein the head body is adapted to receive at least a first carrier housing and a second carrier housing, the first carrier housing adapted to carry the ignition source and having the apertured member thereon and the second carrier housing adapted to carry the ignition source and that omits the apertured member.

15. (Original) The internal combustion engine of claim 1 wherein the ignition source is a center and ground electrodes of a spark plug; and
wherein cavity is substantially cylindrical and a longitudinal central axis of the cavity substantially coincides with a longitudinal central axis of the spark plug.

16. (Withdrawn) A carrier for receiving an ignition source and mounting in an internal combustion engine, the internal combustion engine having at least one combustion chamber, the carrier comprising:

a carrier housing adapted to receive the ignition source; and

an exterior shoulder on the housing adapted to abut the internal combustion engine and position the carrier in relation to the internal combustion engine with the ignition source outside of the combustion chamber, the carrier housing further adapted to cooperate with the internal combustion engine to form a substantially quiescent area about the ignition source.

17. (Withdrawn) The carrier of claim 16 wherein the ignition source is a center and at least one ground electrode of a spark plug.

18. (Withdrawn) The carrier of claim 17 further comprising an internal shoulder in the housing adapted to abut the spark plug and position the spark plug axially in relation to the carrier housing; and

5 wherein the internal shoulder and the external shoulder cooperate to position at least the center electrode outside of the combustion chamber.

19. (Withdrawn) The carrier of claim 16 wherein the carrier housing is substantially tubular; and

10 wherein the carrier further comprises an apertured shield at one end of the carrier housing adapted to jet fluids within the carrier into the internal combustion engine.

20. (Withdrawn) The carrier of claim 16 wherein the carrier is adapted to threadingly engage the internal combustion engine.

15 21. (Withdrawn) The carrier of claim 16 wherein the carrier is adapted to be clamped to the internal combustion engine.

22. (Withdrawn) The carrier of claim 16 wherein the carrier housing is adapted to receive a spark plug having a shield housing substantially encasing at least a portion of the spark plug.

20 23. (Withdrawn) A carrier for receiving a spark plug and mounting in an internal combustion engine, comprising:

a substantially tubular carrier housing adapted to receive a spark plug therein; and

25 an apertured housing at one end of the carrier housing having one or more apertures adapted to allow passage of fluids into an interior of the carrier housing and to jet at least a portion of the fluids out of the carrier housing when at least a portion of the fluids is ignited, the carrier housing adapted to cooperate with at least the apertured housing to form a substantially quiescent area about the ignition source.

24. (Withdrawn) The carrier of claim 23 further comprising an external shoulder on the carrier housing adapted to abut the internal combustion engine and position the carrier in relation to the internal combustion engine with the spark plug outside of a combustion chamber of the engine.

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25. (Withdrawn) The carrier of claim 24 further comprising an internal shoulder in the carrier housing adapted to abut the spark plug and axially position the spark plug relative to the carrier housing.

10 26. (Withdrawn) The carrier of claim 23 wherein the internal combustion engine has a combustion chamber and a cavity in communication with the combustion chamber; and wherein the carrier housing is adapted to be received in the cavity.

15 27. (Withdrawn) The carrier of claim 23 wherein the carrier housing is adapted to threadingly engage the internal combustion engine.

28. (Withdrawn) The carrier of claim 23 wherein the carrier is adapted to be clamped to the internal combustion engine.

20 29. (Currently Amended) A method of combusting a dilute combustion mixture in a main combustion chamber of an internal combustion engine, comprising:

providing a dilute combustion mixture to a main ~~in the~~ combustion chamber;

25 receiving in an auxiliary combustion cavity at least a portion of the dilute combustion mixture from the main combustion chamber through an open end of a the auxiliary combustion cavity such that substantially all of the dilute combustion mixture in the auxiliary combustion cavity is the dilute combustion mixture received from the main combustion chamber, the auxiliary combustion cavity being disposed adjacent to and outside of the main combustion chamber; ~~and substantially~~

30 positioning an ignition source in the auxiliary combustion cavity opposite the open end at sufficient distance from the main combustion cavity to protect ~~protecting~~ at least a portion of the

dilute combustion mixture adjacent the ignition from fluid flows in the main combustion chamber ~~without inducing substantial additional flows adjacent the ignition source;~~

~~with an ignition source in the cavity opposite the open end,~~

igniting with the ignition source the dilute combustion mixture in the auxiliary

5 combustion cavity; and

~~with the ignited dilute combustion mixture from the cavity,~~

igniting at least a portion of the dilute combustion mixture in the main combustion chamber with the ignited dilute combustion mixture from the auxiliary combustion cavity.

10 30. (Original) The method of claim 29 further comprising jetting combusting dilute combustion mixture from the cavity into the combustion chamber through at least one aperture.

31. (Original) The method of claim 29 wherein the ignition source is a spark plug.

15 32. (Original) The method of claim 29 wherein the internal combustion engine is a reciprocating internal combustion engine.

33. (Original) The method of claim 29 wherein igniting the dilute combustion mixture in the cavity comprises supplying a voltage to the ignition source that is less than a voltage that would
20 be required by the ignition source were it positioned outside of the cavity and in the combustion chamber.

34. (Original) The method of claim 29 wherein a temperature of the ignition source is less than a temperature of the ignition source were it positioned outside of the cavity and in the
25 combustion chamber.

35. (Currently Amended) A component of an internal combustion engine system comprising:
a head ~~body~~ defining at least a portion of a main combustion chamber, the main combustion chamber adapted to receive a dilute combustion mixture charge;

a compression member in the main combustion chamber ~~adapted to substantially seal with the body and~~ movable to compress the dilute combustion mixture charge;

a an auxiliary combustion cavity in the head body ~~disposed adjacent to and~~ having an open end in fluid communication with the main combustion chamber, the auxiliary combustion cavity being adapted to receive a dilute portion of the combustion mixture through the open end such that substantially all of the dilute combustion mixture received in the auxiliary combustion cavity is provided from a portion of the combustion mixture received from the main combustion chamber; and

an ignition source residing in the auxiliary combustion cavity, the cavity adapted to create a substantially quiescent area about the ignition source.

36. (Canceled)

37. (Currently Amended) The component of an internal combustion engine system of claim 35 wherein the ~~body~~ head is a cylinder head.

38. (Currently Amended) The component of an internal combustion engine system of claim 35 further comprising a carrier housing removably received in the head body; and

wherein at least a portion of the ignition source is disposed in ~~carried by~~ the carrier housing.

39. (Original) The component of an internal combustion engine system of claim 38 further comprising an apertured member residing on the carrier housing.

40. (Currently Amended) The component of an internal combustion engine system of claim 39 wherein the apertured member is a shield housing encasing the electrode ~~at least a portion of~~ the ignition source.

41. (Original) The component of an internal combustion engine system of claim 35 further comprising an apertured member encasing at least a portion of the ignition source.

42. (Original) The component of an internal combustion engine system of claim 41 wherein the apertured member is between the open end and the ignition source.

43. (Original) The component of an internal combustion engine system of claim 35 wherein the ignition source is at the end of the cavity opposing the open end.

44. (Original) The component of an internal combustion engine system of claim 35 wherein the ignition source is a center and ground electrodes of a spark plug.

45. (Currently Amended) The component of an internal combustion engine system of claim 35 wherein the head body is adapted to receive in at least one auxiliary combustion cavity either at least a first carrier housing adapted to position the ignition source at a first position in relation to the main combustion chamber, or and a second carrier housing, the first carrier housing adapted to position the ignition source at a second position in relation to the main combustion chamber at a different position than the second carrier housing, but not both carriers being received at the same time in the same auxiliary combustion cavity.

46. (Currently Amended) The component of an internal combustion engine system of claim ~~35~~ 45 wherein the ~~body~~ head is adapted to receive at least a first carrier housing and a second carrier housing, the first carrier housing adapted to carry the ignition source and having the apertured member thereon and the second carrier housing adapted to carry the ignition source and that omits the apertured member.

47. (New) The internal combustion engine system of claim 43 wherein the longitudinal central axis of the auxiliary combustion cavity substantially coincides with the longitudinal axis of the ignition source.

48. (New) The internal combustion component of Claim 35 wherein the ignition source is disposed in the auxiliary combustion cavity a sufficient distance from the main combustion

Applicant : George P. Klonis, et al.

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chamber to protect at least a portion of the dilute combustion mixture adjacent the ignition from fluid flows in the main combustion chamber.